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To Whom It May Concern:

I am a professor of Aerospace Engineering Sciences at the University of Colorado Boulder. I have been working in the GPS field for 25 years. The benefits of GPS to safety and commerce are well-known and widely appreciated. The serious threat to GPS operations in the U.S. presented by the Lightsquared proposal has been well-documented in the interference evaluation committee's report recently submitted to the FCC. This report makes it clear that high-power terrestrial broadband broadcasts and GPS are simply not compatible in the same frequency band. While I am strongly in favor of opening up opportunities for broadband communications across the U.S., it does not make any sense to do so in a way which cripples satellite-based position and navigation operations and the many innovative commercial and scientific ventures that GPS supports.

I believe that there is a serious misconception among supporters of the Lightsquared proposal that GPS uses spectrum inefficiently or that GPS technology is antiquated. While GPS has many similarities to wireless communications, the use of radio signals for position, navigation, and time (PNT), has several key fundamental differences from signals used solely for communications. The most important is that a communication user is primarily interested in signal-to-noise ratio (SNR) while a ranging user is primarily interested in the predictability of the signal path. For communications, a higher SNR provides better reception of data and allows for higher data rates. The only type of interference that matters in communication applications is one that reduces SNR. For these users, filtering out-of-band signals may not have a substantial impact on communication performance. On the other hand, PNT users of radio signals care primarily about knowing the path taken by the signal and measuring the arrival time as accurately and precisely as possible. Interference that limits a navigation receiver's ability to measure the true arrival time of the ranging code and the phase of the underlying carrier signal, severely impacts PNT performance. This is not a matter of inefficient spectrum use – it is a direct result of the different way in which the signals are used for PNT as compared to communications.

The vast array of applications enabled by the highly capable global navigation satellite system developed and operated by the U.S. have created whole new industries and contribute substantially to U.S. technological leadership in both commercial and defense sectors. As the Lightsquared test results showed, receivers designed for critical applications, like aviation, and for high precision, like surveying and precision agriculture, are the ones most negatively impacted by Lightsquared's proposed terrestrial transmissions. The U.S. should absolutely not allow for the severe degradation of GPS service by Lightsquared's proposed service. Furthermore, the FCC should not allow itself to be coerced by Lightsquared's gamble on approval into repurposing the Mobile Satellite Services frequencies, which until now have been allocated and used for space/ground links, to new high-power terrestrial transmissions. Rather, the re-allocation of appropriate spectrum for valuable new terrestrial broadband communications services should be executed by the FCC in a careful, deliberate manner that realistically addresses and weighs the real benefits and costs of the allocation.

Sincerely,
Penina Axelrad